

Notice of Allowability

Application No.

10/041,896

Examiner

Jennifer M. Dolan

Applicant(s)

KRAUS ET AL.

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Amdt. and Remarks of 3/31/04.
2. ☒ The allowed claim(s) is/are 22,23,25,28,65,67,68,70,71 and 74-77.
3. ☒ The drawings filed on 07 January 2002 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date 1/7/02, 12/30/02, 11/20/03, 8/27/03, 5/29/03
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____.
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____


CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

DETAILED ACTION

This action is in response to the Amendment filed 3/31/04

Allowable Subject Matter

1. Claims 22, 23, 25, 28, 65, 67, 68, 70, 71, and 74-77 are allowed.
2. The following is an examiner's statement of reasons for allowance: The primary reason for allowance is that the prior art essentially fails to suggest DRAM storage capacitors having a dielectric region either comprising amorphous aluminum nitride of less than 60 angstroms thickness (cl 28), comprising aluminum nitride where the capacitor dielectric has a thickness of less than 50 angstroms (cl 25), or consisting essentially of aluminum nitride and a native oxide having a total thickness of less than 60 angstroms (cl 23).

The closest prior art of record is U.S. Patent No. 6,218,293 to Kraus et al. It is noted that the Kraus patent and the present application are both assigned to Micron technology, as per the applicant's statement in the Remarks filed on 3/31/04, and thus the '293 patent does not qualify as valid prior art for 35 U.S.C. 103 (a) rejections under 35 U.S.C. 102 (e). Kraus teaches a similar structure to that claimed in the present application, except that the aluminum nitride capacitive layer is not substantially amorphous, does not have a thickness of less than 50 angstroms, and does not include a native oxide layer, thus making the '293 reference inapplicable for 102 (e) based rejections.

Aside from the Kraus reference *supra*, the closest prior art includes U.S. Patent No. 6,285,050 to Emma et al., which teaches a memory circuit including a decoupling capacitor having an optional aluminum nitride layer in the capacitor dielectric region. Since the capacitor in Emma is a decoupling capacitor, and since Emma teaches that the AlN layer is purely an optional layer accompanying a BST or high dielectric constant layer, and since Emma further fails to suggest a thickness for the capacitive layers, it is the examiner's opinion that it is well beyond the purview of a person having ordinary skill in the art to pluck the AlN layer out of the capacitive structure in Emma, insert it into a memory storage capacitor for a DRAM, and then select a very small thickness for such a layer.

U.S. Patent No. 5,977,582 to Fleming et al teaches a thin capacitor structure wherein the dielectric layer is formed of a dielectric TaAlON. It is the examiner's opinion, however, that a person skilled in the art would not consider the TaAlON of Fleming to be the same as or to be suggestive of the use of "aluminum nitride," due to the vastly different structure and properties between the two compositions. Thus, a person skilled in the art would not find it an obvious step to use AlN in place of the TaAlON, particularly when the disclosed composition of Fleming contains a very small portion of aluminum and nitrogen relative to the amount of tantalum and oxygen.

Since the valid prior art does not provide any reasonable suggestion of the usage of aluminum nitride in the capacitor dielectric layer of a DRAM memory cell, it is the examiner's opinion that a person skilled in the art would have been led to use conventional DRAM capacitor dielectric layers, rather than aluminum nitride.

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Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer M. Dolan whose telephone number is (571) 272-1690. The examiner can normally be reached on Monday-Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W. Whitehead, Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer M. Dolan
Examiner
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